CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-33

March 28, 1977

1. Name of fault: Montecito fault.

2. Location of fault: Santa Barbara and Carpenteria quadrangles, City of Montecito, Santa Barbara County, California (see figure 1).

3. Reason for evaluation: This fault lies in a populated area located within the 1976 study area of 10 year program for fault evaluation in the state (see SP 42, 1977 edition, p. 6).

4. List of references:

a) Geotechnical Consultants, 1974, Hydrogeologic investigation, Montecito ground water basins, for Montecito Water District, 64 p., plate 3 (scale 1:24,000).

b) Jennings, C.W., Fault map of California: California Division of Mines and Geology, California Geologic Data Map Series, Map no. 1, scale 1:750,000.

c) Moore and Taber, 1974, Santa Barbara County comprehensive plan -- seismic safety element, 93 p.

d) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey, Map MF-585, scale 1:250,000.

e) NASA, 1973, U-2 aerial photographs, False-color IR, flight no. 73-194, roll 01541, frames 6519 to 6521 (scale 1:125,000).

f) Dibblee, T.W., 1966, Geology of the central Santa Ynez Mountains, Santa Barbara County; California Division of Mines and Geology, Bulletin 186, 93p. Plate 1 (scale 1:31,680).

From Jennings (1975)

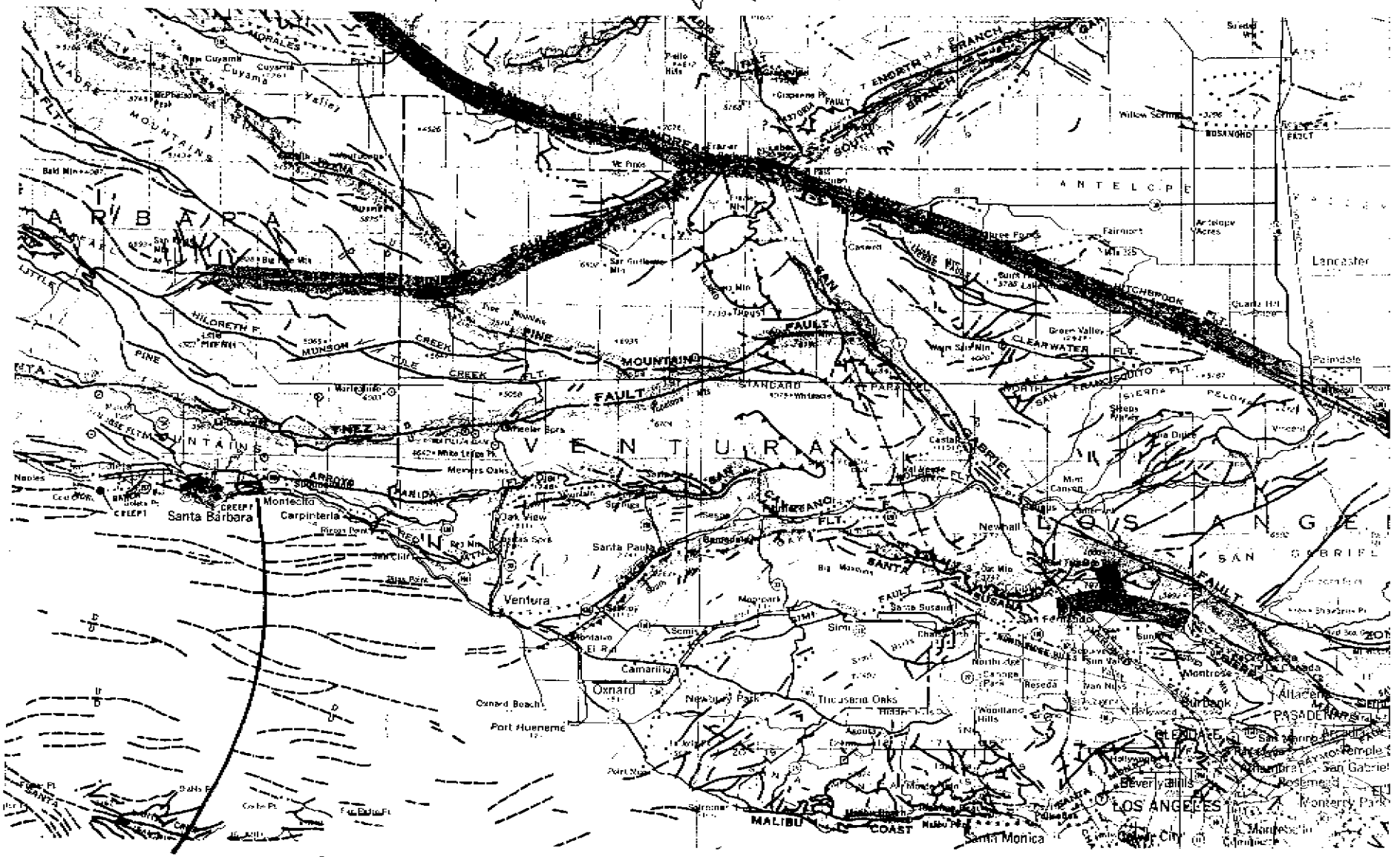

Fig 1
Index Map

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5. Summary of available data:

The Montecito fault first appears in the literature in Geotechnical Consultants (1974) ground water report for Montecito Water District. On pages 21 and 22 of their report they state:

"A third, previously unmapped fault, herein defined as the Montecito Fault, is postulated to extend through Montecito Basin based upon results of our drilling program. The extension of the Montecito Fault south of the Arroyo Parida Fault has divided Montecito Basin into three structural blocks. This has produced a zone between the two faults that has been upthrown relative to the blocks to the north and south.

Using the limited data previously available, combined with that subsequently obtained from our exploration program, an attempt was made to contour the base of the fresh water within the unconsolidated deposits in the basin. As shown on Plate 5 -- Contours on Base of Fresh Water, the water-bearing deposits are thinner north of the Arroyo Parida Fault, are noticeably thinner within the upthrown central block, and gradually thicken on the south side of the fault zone to a maximum depth of approximately 1200(?) feet at their termination along the Rincon Creek Thrust Fault. The dip of the Montecito Fault is assumed to be vertical with the north side of the fault being upthrown on the order of several hundred feet. Recent activity of this fault can be seen in offset terrace deposits and alluvium west of Montecito.

From the meager water level data in Montecito Basin, it appears that both the Arroyo Parida and Montecito Faults have

created barriers to the movement of ground water. In effect, the basin may be divided into three sections with ground water levels remaining historically higher on the north sides of each fault (see Water Level Contours -- Plates 6.1 and 6.2). The change in the contour gradient near the faults indicates the zone represents a pronounced ground water barrier."

Plate 6.2 from the Geotechnical report has been reproduced and included in this report (see figure 2). This map shows the contour lines drawn to the base of fresh water in the Montecito basin. Some problems exist, however, with the interpretation on this map. First, there doesn't seem to be enough wells and test holes to construct the contour lines with any real degree of certainty. Second, the water level information is gathered over a three-year period (1970-1973) instead of simultaneously. Fluctuations in the ground water levels due to increased or decreased amounts in the draw-down could influence the interpretation.

The youngest unit shown to be offset by the Montecito fault is shown by Geotechnical Consultants (plate 3) to be a Quaternary terrace deposit. Dibblee (1966) shows this unit to be an older fan deposit of middle Pleistocene age. Plate 3 from their report has also been reproduced in this report (see figure 3). As can be seen on figure 3, the western portion of the fault is defined by the contact of Monterey rocks on the north and terrace deposits on the south. The eastern two-thirds of the fault is shown to be concealed by Holocene alluvial deposits.

Ziony, et al. (1974), Jennings (1975), and Moore and Taber (1974) all show this fault as Quaternary based on Geotechnical Consultants ground water data. Moore and Taber classify this fault as inactive but

call attention to the fact that Pleistocene stream deposits may be faulted on the east end of this fault. This is not a direct observation, but is based on evidence in Geotechnical Consultants report.

6. Air photo interpretation:

This area has been undergoing development since the turn of the century. Small scale fault-related features almost certainly would have been obliterated by grading, if they existed at all. NASA, high altitude photos were examined. The western portion of the fault does have some topographic expression. The hills above the fault generally define the western end of it. These hills climb rather steeply out of the valley and form a fairly linear escarpment through the ~~eastern~~ WESTERN part of the City of Montecito. No other features indicative of faulting were seen.

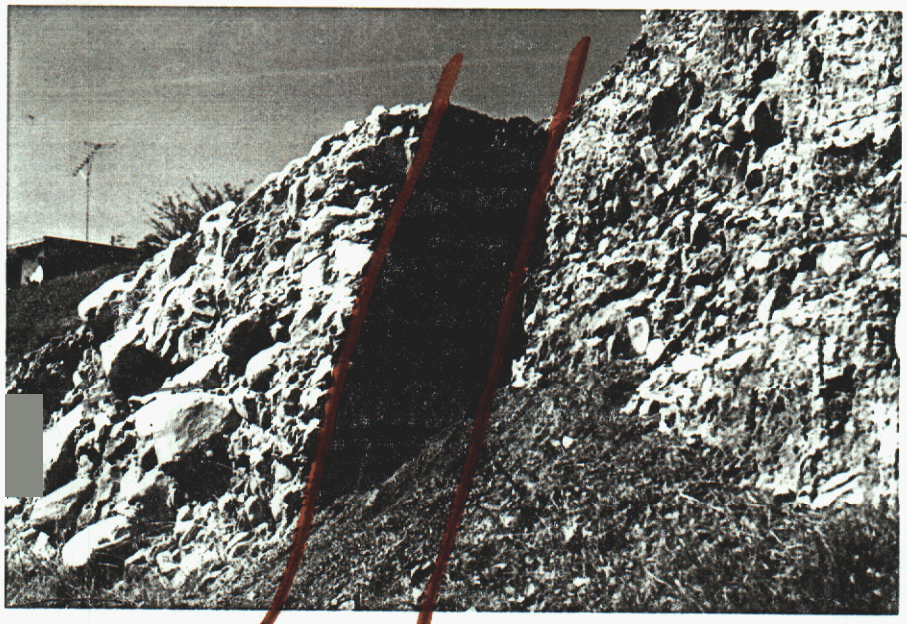
7. Field observations:

Limited field work was done along the Montecito fault. The reason for this is the lack of surface evidence for faulting. See figure 3 for numbered localities correlated to numbers below.

1) A road cut on the north side of Chase Street in the City of Montecito revealed the only exposure of the Montecito fault I could find. Here, a bouldery fanglomerate deposit (referred to as terrace deposits by Geotechnical Consultants) is cut by at least two faults, which essentially define one narrow fault zone (see figure 4 with photo). These faults dip steeply to the south and strike N 80° W. The location and attitude of these faults match that shown by Geotechnical Consultants as the Montecito fault. No evidence of rupture in the modern erosional surface was seen.

Fig. 4

View looking west at cut exposing faulted fanglomerates (Geo-tech refers to them as terrace deposits)



Fault - N 80° W
80° southerly dip

2) A check along the strike of the fault at the base of the hills to the east of locality 1 revealed no further surface evidence of faulting.

3) Montecito Creek and Oak Creek located by the arrows on figure 3 revealed no evidence of faulting along these banks. However, I may have only been looking at very young Holocene alluvium.

8. Conclusions:

The Montecito fault seems to be fairly well located in the subsurface (Geotechnical Consultants, 1974) but as a surface feature it is difficult to evaluate. The age of most recent faulting is probably Pleistocene (late?). However, no Holocene units are known to be offset.

9. Recommendations:

I recommend that the Montecito fault should not be zoned for special studies at this time.

10. Investigating geologist's name; date:

Edward J Bortugno

EDWARD J. BORTUGNO
Geologist
March 28, 1977

I agree with recommendation
4/13/77